

What is claimed is:

1. A method of transmitting a working context, comprising:

selecting a power-off standby mode;

5 transmitting a working context with respect to at least one hardware module mounted on a semiconductor chip to a predetermined memory, and storing the working context in the predetermined memory;

transmitting the working context stored in the predetermined memory to a non-volatile memory outside the semiconductor chip, and storing the working context in  
10 the non-volatile memory; and

executing the power-off standby mode.

2. The method of claim 1, further comprising:

releasing the power-off standby mode;

15 restoring the working context with respect to the at least one hardware module from the non-volatile memory to the predetermined memory; and

recovering the at least one hardware module to a state immediately before the power-off standby mode was executed by using the working context restored to the predetermined memory from the non-volatile memory.

20 3. The method of claim 1, wherein the non-volatile memory is a NAND flash memory or a NOR flash memory.

25 4. The method of claim 1, wherein the predetermined memory is outside the semiconductor chip.

5. The method of claim 1, further comprising cutting off a power supplied to the hardware module for which the working context is stored in the non-volatile memory, when the power-off standby mode is executed.

6. The method of claim 2, further comprising supplying the power again to the at least one hardware module to which the power supply was cut off during the power-off standby mode, when the power-off standby mode is released.

5 7. An integrated circuit comprising:  
at least one hardware module;  
a memory for storing working context with respect to the at least one hardware module;  
a microprocessor for transmitting the working context with respect to the at least  
10 one hardware module and its own working context to the memory in a power-off standby mode; and  
a working context transmitting controller for transmitting the working context with respect to the at least one hardware module, the working context being stored in the memory, to a non-volatile memory outside the integrated circuit, in response to a  
15 predetermined command signal.

8. The integrated circuit of claim 7, wherein the working context transmitting controller includes:

20 a direct memory access unit for inputting and outputting the working context between the memory and the non-volatile memory;

a control register including a plurality of registers, each of which has corresponding area information on the memory and/or the non-volatile memory;

an interface between the direct memory access unit and the non-volatile memory; and

25 a controller for transmitting the working context from the memory to the non-volatile memory through the interface during the power-off standby mode, and transmitting the working context stored in the non-volatile memory to the memory through the interface when the power-off standby mode is released.

30 9. The integrated circuit of claim 7, wherein the predetermined command signal is output from the microprocessor or the at least one hardware module.

10. The integrated circuit of claim 7, wherein the working context transmitting controller restores the working context with respect to the at least one hardware module, which is stored in the non-volatile memory, and the working context with respect to the microprocessor to the memory, when the power-off standby mode is released.

11. The integrated circuit of claim 10, wherein the microprocessor recovers a state of the at least one hardware module and a state of the microprocessor to their respective states existing immediately before the power-off standby mode was executed by using the working context with respect to the at least one hardware module and the working context with respect to the microprocessor, which are restored to the memory.

12. An integrated circuit comprising:  
at least one hardware module;  
a microprocessor for transmitting working context with respect to the at least one hardware module and its own working context to a memory outside the integrated circuit, in a power-off standby mode; and  
a working context transmitting controller for transmitting the working context with respect to the at least one hardware module from the memory to a non-volatile memory outside the integrated circuit, in response to a predetermined command signal.

13. The integrated circuit of claim 12, wherein the working context transmitting controller includes:

a direct memory access unit for inputting and outputting the working context between the memory and the non-volatile memory;

a control register including a plurality of registers, each of which has corresponding area information on the memory and/or the non-volatile memory;

an interface between the direct memory access unit and the non-volatile memory; and

a controller for controlling the working context to be transmitted from the memory to the non-volatile memory through the interface during the power-off standby mode,

and controlling the working context stored in the non-volatile memory to be transmitted to the memory through the interface when the power-off standby mode is released.

14. The integrated circuit of claim 12, wherein the predetermined command  
5 signal is output from the microprocessor or the at least one hardware module.

15. The integrated circuit of claim 12, wherein the working context transmitting  
controller restores the working context with respect to the at least one hardware module,  
which is stored in the non-volatile memory, and the working context with respect to the  
10 microprocessor to the memory, when the power-off standby mode is released.

16. The integrated circuit of claim 15, wherein the microprocessor recovers a  
state of the at least one hardware module and a state of the microprocessor to their  
respective states existing immediately before the power-off standby mode was executed  
15 by using the working context with respect to the at least one hardware module and the  
working context with respect to the microprocessor, which are restored in the memory.

17. A method of transmitting working context, comprising:  
storing working context with respect to a plurality of hardware modules, which are  
20 mounted on a semiconductor chip, in a predetermined memory during a power-off  
standby mode; and  
transmitting the working context stored in the memory during the power-off  
standby mode to a non-volatile memory outside the semiconductor chip.

18. The method of claim 17, further comprising:  
restoring the working context corresponding to the plurality of hardware modules,  
which is stored in the non-volatile memory, in the predetermined memory, when the  
power-off standby mode is released; and  
25 respectively recovering the plurality of hardware modules to their states existing  
immediately before the power-off standby mode was executed by using the working  
context restored in the memory.  
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19. The method of claim 17, wherein the memory is outside of the semiconductor chip.

5           20. An integrated circuit comprising:  
a plurality of hardware modules;  
a memory for storing working context with respect to the plurality of hardware  
modules; and  
a working context transmitting controller for transmitting the working context  
10 stored in the memory to a non-volatile memory outside the integrated circuit during a  
first operating mode, and transmitting the working context with respect to the hardware  
modules, which is stored in the non-volatile memory, to the memory during a second  
operating mode,  
wherein at least one of the hardware modules is recovered to a state existing  
15 immediately before the first operating mode was executed by using the working context,  
which is transmitted from the non-volatile memory to the memory during the second  
operating mode.

20           21. The integrated circuit of claim 20, further comprising a power controller for  
controlling power respectively supplied to the plurality of hardware modules to be turned  
on or off according to the first operating mode or the second operating mode.

22. The integrated circuit of claim 20, wherein the working context transmitting  
controller includes:

25           a direct memory access for inputting and outputting the working context between  
the memory and the non-volatile memory;

          a control register including a plurality of registers, each of which has  
corresponding area information on the memory and the non-volatile memory;

          an interface between the direct memory access and the non-volatile memory;

30           and

a controller for controlling the working context to be transmitted from the memory to the non-volatile memory through the interface during the first operating mode, and controlling the working context stored in the non-volatile memory to be transmitted to the memory through the interface during the second operating mode.

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23. The integrated circuit of claim 20, wherein the first operating mode is a mode for cutting off power supplied to at least one hardware module, which is operating among the plurality of hardware modules, and the second operating mode is a mode for supplying power again to the at least one hardware module, to which the power supply was cut off during the first operating mode.

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24. An integrated circuit comprising:

a plurality of hardware modules; and

a working context transmitting controller for transmitting working context with respect to the plurality of hardware modules from a memory outside the integrated circuit to a non-volatile memory outside the integrated circuit, during a first operating mode, and transmitting the working context with respect to the plurality of hardware modules stored in the non-volatile memory to the memory during a second operating mode,

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wherein the plurality of modules are recovered to a state existing immediately before the first operating mode was executed by using the working context transmitted from the non-volatile memory to the memory during the second operating mode.

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25. The integrated circuit of claim 24, wherein when at least one hardware module among the plurality of hardware modules controls the operation of the remaining hardware modules, each of the remaining hardware modules is recovered to a state existing immediately before the first operating mode was executed by using the working context transmitted from the non-volatile memory to the memory by the control of the at least one hardware module during the second operating mode.

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26. The integrated circuit of claim 24, further comprising a power controller for controlling the power supplied to the hardware modules to be turned on or off according to the first operating mode or the second operating mode.

5 27. The integrated circuit of claim 24, wherein the working context transmitting controller includes:

a direct memory access unit for inputting and outputting the working context between the memory and the non-volatile memory;

10 a control register including a plurality of registers, each of which has corresponding area information on the memory and the non-volatile memory;

an interface between the direct memory access unit and the non-volatile memory; and

15 a controller for controlling the working context to be transmitted from the memory to the non-volatile memory through the interface during the first operating mode, and controlling the working context stored in the non-volatile memory to be transmitted to the memory through the interface during the second operating mode.

20 28. The integrated circuit of claim 24, wherein the first operating mode is a mode for cutting off power supplied to the at least one hardware module, and the second operating mode is a mode for supplying power again to the at least one hardware module, to which the power supply was cut off during the first operating mode.

29. A system comprising:

an integrated circuit having at least one hardware module; and

25 a non-volatile memory outside the integrated circuit,

wherein the integrated circuit includes:

a memory for storing working context with respect to the at least one hardware module; and

30 a working context transmitting controller for transmitting the working context stored in the memory to the non-volatile memory during a power-off standby mode, and transmitting the working context with respect to the at least

one hardware module, which is stored in the non-volatile memory, to the memory when the power-off standby mode is released,

wherein when the power-off standby mode is released, the at least one hardware module is recovered to a state existing immediately before the power-off standby mode was executed by using the working context, which is transmitted to the memory.

30. The system of claim 29, wherein the working context transmitting controller includes:

a direct memory access unit for inputting and outputting the working context between the memory and the non-volatile memory;

a control register including a plurality of registers, each of which has corresponding area information on the memory and/or the non-volatile memory;

an interface between the direct memory access unit and the non-volatile memory; and

a controller for controlling the working context to be transmitted from the memory to the non-volatile memory through the interface during the power-off standby mode, and controlling the working context to be transmitted from the non-volatile memory to the memory through the interface when the power-off standby mode is released.

31. A system comprising:

an integrated circuit including at least one hardware module;

a memory existing outside the integrated circuit for storing working context with respect to the hardware module; and

a non-volatile memory existing outside the integrated circuit,

wherein the integrated circuit includes a working context transmitting controller for transmitting the working context stored in the memory to the non-volatile memory during a power-off standby mode, and transmitting the working context with respect to the at least one hardware module, which is stored in the non-volatile memory, to the memory when the power-off standby mode is released,

wherein the at least one hardware module is recovered to a state existing immediately before the power-off standby mode was executed by using the working

context transmitted from the non-volatile memory to the memory, when the power-off standby mode is released.

32. The system of claim 31, wherein the working context transmitting  
5 controller includes:

a direct memory access unit for inputting and outputting the working context  
between the memory and the non-volatile memory;

a control register including a plurality of registers, each of which has  
corresponding area information on the memory and/or the non-volatile memory;

10 an interface between the direct memory access unit and the non-volatile  
memory; and

a controller for controlling the working context to be transmitted from the memory  
to the non-volatile memory through the interface during the power-off standby mode,  
and controlling the working context stored in the non-volatile memory to be transmitted  
15 to the memory through the interface when the power-off standby mode is released.

33. The system of claim 31, wherein the at least one hardware module is a  
microprocessor.